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TRW Inc.

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Cleveland, OH 44124-3760

SFUND RECORDS CTR
89560

3 September 1999

Mr. Ejigu Solomon
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013

Re: Request for Onsite Groundwater System Closure
The Monadnock Company Site
18301 Arenth Avenue, City of Industry, California

Dear Mr. Solomon:

Pursuant to discussion with you during our meeting on 31 August 1999, TRW Inc. (TRW) requests approval for closure of the onsite groundwater extraction and treatment system at the Monadnock Company site in City of Industry, California. A summary of the system design, operation, and performance is provided in the attached report.

TRW is requesting closure of the groundwater system because volatile organic compound (VOC) concentrations beneath the site appear to have reached generally stable levels, independent of the operation of the system. Furthermore, historic performance data do not indicate that the system has had an additional beneficial effect in reducing VOC concentrations in onsite groundwater since system startup in 1995. TRW believes that the requirements of the Regional Water Quality Control Board (RWQCB) for this site have been satisfied with regard to onsite groundwater contamination. It is expected that the offsite impact to groundwater associated with this site will be addressed as part of the regional remedy for the Puente Valley Operable Unit.

The attached report provides groundwater system performance and VOC data in support of this request for groundwater system closure. TRW appreciates the RWQCB's review of these data and its consideration of TRW's request for onsite closure.

If you have any questions regarding this request or would like to further discuss site conditions, please do not hesitate to contact me at (216) 291-7752.

Sincerely,

Joseph P. Kwan
Director, Environmental Remediation

Attachment

GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PERFORMANCE THE MONADNOCK COMPANY CITY OF INDUSTRY, CALIFORNIA

1.0 BACKGROUND

The Monadnock Company (Monadnock) site is located at 18301 Arenth Avenue in City of Industry, California. TRW formerly used the facility to fabricate fasteners and electronic hardware from 1968 to 1980, using manufacturing processes that included degreasing, heat treating, and metal plating. Volatile organic compounds (VOCs) used in these processes, in addition to cadmium, chromium, and cyanide, have been detected in groundwater beneath the site.

Groundwater investigation and monitoring have been conducted at the Monadnock facility since 1986. Eight monitoring wells have been installed at locations both onsite and offsite (Figure 1), and include seven wells in the shallow interval (extending to about 45 to 60 feet below ground surface [bgs]) and one well in a deeper interval (extending to 97 feet bgs). One shallow onsite monitoring well (MW-2) has been converted for use as an extraction well, as discussed below.

2.0 GROUNDWATER CONDITIONS

The water table occurs at a depth of about 30 to 32 feet bgs and exhibits minimal seasonal fluctuations, generally varying only about one to two feet in elevation during the past five years. The stratigraphy within the saturated zone consists predominantly of silty to clayey sand, grading into a cleaner and coarser sand below a depth of about 85 feet bgs.

Historic analytical results for the eight wells indicate that groundwater is impacted primarily by trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), and tetrachloroethene (PCE), in addition to chromium and cyanide. The shallow VOC plume is oriented in a west-southwest direction, similar to the direction of groundwater flow, and extends offsite across Fullerton Road to the area of well MW-12 (Figure 1). Shallow VOC concentrations are greatest in onsite well MW-2 and offsite well MW-12, and are substantially lower in the nearby surrounding wells, indicating that the plume is only about 200 feet in width. The greatest VOC concentrations were observed in 1986, but have declined appreciably since that time.

VOC concentrations in the one deeper monitoring well at the site, MW-11, indicate that the impact to the deeper interval is substantially less than the shallow interval. Historical groundwater analytical results for all wells are provided in Table 1 and are discussed in Section 5.0 below.

3.0 GROUNDWATER TREATMENT SYSTEM

A groundwater treatment system utilizing well MW-2 for extraction was implemented onsite in November 1995 for the purpose of remediating shallow VOC-impacted groundwater. The system extracts groundwater from well MW-2 using an electric submersible pump and routes it through a three-canister carbon adsorption unit to remove VOCs and a four-cartridge ion exchange unit to remove chromium. Treated groundwater is discharged to the stormdrain under a National Pollutant Discharge Elimination System (NPDES) permit. A description of the system and its operation is provided in a report prepared by Id Environmental Associates, Inc. (IDEA) and submitted to the Regional Water Quality Control Board (RWQCB) in December 1995.

Prior to treatment system installation, a well yield test was conducted to estimate the maximum expected discharge rate that well MW-2 is capable of sustaining during long-term pumping. The test was conducted with the pump set at a depth of about 41.5 feet bgs (intake at 41 feet bgs), which is about three feet above the bottom of the well (44.5 feet bgs). Analysis of both the pumping and recovery data indicated that the long-term sustainable yield of well MW-2 under current water-level conditions is about 0.5 to 1.0 gallons per minute (gpm).

4.0 TREATMENT SYSTEM PERFORMANCE

The treatment system was started in November 1995 and was operated continuously until June 1998. The system has been out of service since that time because it was damaged by site construction activities and requires repair.

The system was operated at an average flow rate of about 0.6 gpm in 1996 and 1997, but the rate declined to about 0.2 gpm in 1998. The decline is believed to be due to clogging of the chromium filters and is not related to the aquifer yield. The total volume of groundwater pumped annually was about 288,000 gallons in 1996, about 294,000 gallons in 1997, and about 45,000 gallons in 1998, for a total flow volume of 627,000 gallons since system startup. Based on these flow volumes and the total VOC concentrations in groundwater extracted from well MW-2 (averaged yearly based on the semiannual sampling results), the total pounds (lbs) of VOCs removed by the system are as follows: 0.9 lbs in 1996; 1.04 lbs in 1997; and 0.36 lbs in 1998. A total of 2.3 lbs of VOCs have been removed since system startup in 1995.

5.0 HISTORIC GROUNDWATER CHEMICAL CONCENTRATIONS

5.1 VOC Concentrations

Hydrographs of VOC concentrations versus time were generated for shallow wells MW-2, MW-7, MW-8, and MW-12 using the monitoring data presented in Table 1, and are shown as Figures 2 through 5, respectively. These hydrographs depict the trend in

VOC concentrations since each of the wells was installed. Hydrographs of water levels versus time for the four wells are shown on Figures 6 through 9.

As indicated on Figures 2, 3, and 4, VOC concentrations in wells MW-2, MW-7, and MW-8 have declined appreciably since 1986 and 1987, but reached generally stable concentrations in about mid 1995, prior to installation of the groundwater extraction and treatment system. Operation of the treatment system from November 1995 through June 1998 does not appear to have resulted in an additional reduction in VOC concentrations, as discussed below. VOC concentrations in well MW-12 (Figure 5) have fluctuated sporadically and exhibited no appreciable decline since installation in 1995.

Total VOC concentrations in well MW-2 have declined from a maximum of about 1800 µg/l in 1986 to 102.9 µg/l in February 1999. However, the total concentration remained generally stable from 1995 to 1998, varying from about 330 µg/l to 500 µg/l during the semiannual monitoring events conducted in 1996 through 1998. The only exception was a temporary increase in February 1998. Concentrations have since declined to the lowest levels historically recorded, despite shutdown of the system in June 1998. The well exhibited no apparent concentration decline as a result of groundwater extraction and treatment conducted from November 1995 until June 1998, but has exhibited a decline following shutdown of the system.

Total VOC concentrations in well MW-12, which was installed downgradient of well MW-2 in 1995, have fluctuated widely since 1995 and have exhibited no appreciable decline. These fluctuations appear unrelated to either operation or shutdown of the groundwater extraction and treatment system, but rather appear to coincide with fluctuations in the water table.

Wells MW-7 and MW-8 have demonstrated trends similar to that observed in well MW-2, declining appreciably since 1987 but remaining at generally stable levels from 1995 through 1998, and then declining to historically low levels in 1999. The wells exhibited the same temporary increase in February 1998 as that observed in well MW-2. The wells exhibited no apparent concentration decline as a result of groundwater extraction and treatment conducted from November 1995 until June 1998, but they have exhibited a decline following shutdown of the system.

Total VOC concentrations in the one deeper monitoring well at the site, MW-11, have historically been substantially less than in the shallow interval. Maximum concentrations recorded in 1989 were about 300 µg/l, but declined below 100 µg/l by 1994 and have remained at these low levels since that time. Total concentrations since mid 1995 have ranged from about 40 µg/l to 60 µg/l, with the exception of the temporary increase in February 1998 that was also observed in the shallow wells. Operation and shutdown of the shallow treatment system does not appear to have had an impact on the deeper interval.

5.2 Metals and Cyanide Concentrations

Historic metals and cyanide analytical results indicate that chromium and cyanide have been present in several wells at concentrations exceeding maximum contaminant levels (MCLs). Chromium has been detected in all wells during one or more previous monitoring events. However, since 1994 only well MW-2 has exhibited chromium levels which exceed the MCL, with the exception of a one-time occurrence in well MW-12 in February 1998. The chromium concentration in well MW-2 has been below the MCL since 1997, with the exception of the August 1998 sampling event. Cyanide historically has been present in wells MW-2, MW-7, and MW-12, often at levels exceeding the MCL. However, since early 1998 only well MW-2 has exhibited concentrations above the MCL.

6.0 SUMMARY

VOC-impacted groundwater beneath the site and vicinity occurs primarily in the shallow interval (about 30 to 60 feet bgs), and is restricted to a narrow plume of about 200 feet in width. Stratigraphy within the shallow interval is comprised predominantly of fine-grained materials consisting of silty to clayey sands. Hydraulic testing of extraction well MW-2 indicates correspondingly low hydraulic conductivity values in this interval and an estimated long-term sustainable well yield of only about 0.5 to 1.0 gpm.

A groundwater extraction and treatment system utilizing shallow well MW-2 was operated from late 1995 until June 1998, at an average discharge rate of about 0.6 gpm. The system removed a total of 2.3 lbs of VOCs during this period. The system has been out of service since June 1998 due to damage sustained during site construction activities.

Total VOC concentrations in the shallow interval onsite have declined substantially since monitoring began in 1986. However, concentrations reached generally stable concentrations in about mid 1995, prior to installation of the groundwater extraction and treatment system, and remained at those levels during system operation. Concentrations have since declined to the lowest levels historically recorded following shutdown of the system in June 1998.

Operation of the treatment system did not result in an additional reduction in VOC concentrations following its startup in November 1995. The onsite groundwater VOC plume appears to have reached stable concentrations independent of treatment system operation and has exhibited no apparent benefit from the system. Furthermore, plume concentrations have shown no increase following shutdown of the system, but instead have continued to decline due to natural attenuation processes.

TABLE 1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	200	32	5	6	0.5	100¹	NE	5	5	10	50	0.2²
MW-1												
Jul-86	<25	NA	NA	NA	NA	NA	ND	<25	<25	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-88	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA
Jun-89	ND	NA	NA	ND	NA	NA	ND	ND	ND	NA	NA	NA
Jan-90	ND	NA	NA	ND	NA	NA	ND	1.3	ND	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	<1	ND	<1	<1	NA	NA	NA
Aug-94	<1	<1	<1	<1	<1	<1	ND	<1	<1	<1	7.7	<0.01
Mar-95	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Aug-95	<1	<1	<1	1.5	<1	<1	ND	<1	<1	<5	<10	<0.1
Feb-96	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.2
Aug-96	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Aug-97	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Feb-98	<1	<1	<1	<1	<1	<1	ND	1.06	<1	<5	<10	<0.01
Aug-98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Feb-99	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-2												
Jul-86	380	NA	NA	NA	NA	NA	ND	310	710	NA	NA	NA
Sep-86	180	NA	NA	NA	NA	NA	ND	600	560	NA	NA	NA
Nov-86	350	NA	NA	NA	NA	NA	ND	770	710	NA	NA	NA
Feb-87	77	NA	NA	NA	NA	NA	ND	190	620	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-87	12	NA	NA	NA	NA	NA	ND	102	182	NA	NA	NA
Feb-88	25	NA	NA	NA	NA	NA	ND	78	102	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	NA	ND	70	120	NA	NA	NA
Jun-89	ND	NA	NA	180	NA	NA	ND	320	270	NA	NA	NA
Jan-90	7	NA	NA	840	NA	NA	ND	410	460	NA	NA	NA
Jun-94	<1	21	10	120	3.3	2.4	ND	130	590	NA	NA	NA
Aug-94	<1	19	8.6	160	3.4	1.3	ND	100	390	<1	162	0.57
Mar-95	<1	17.5	8.3	176	4.1	2.5	ND	102	330	<5	206	<0.01
Aug-95	<1	<1	5.8	82	2	2.1	ND	12	170	<5	164	1.82
Feb-96	<2.5	3.5	<2.5	98	<2.5	<2.5	ND	69	200	<5	85.6	1.60
Aug-96	<1	5.3	3.6	95	<1	1.1	ND	53	220	<5	60.8	0.25
Aug-96 Dup	<1	5.5	3.7	97	1.2	1.2	ND	54	220	NA	NA	NA
Feb-97	<1	4.7	2.2	70	1.2	<1	ND	51.8	220	<5	43.4	0.693

TABLE 1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	200	32	5	6	0.5	100¹	NE	5	5	10	50	0.2²
Aug-97	<5	<5	<5	160	<5	<5	ND	79	260	<5	42	0.16
Feb-98	<1	6.76	5.65	325	2.89	2.1	ND	152	456	<5	47	0.363
Sep-98*	<0.5	2.9	2.1	89	1.1	<0.5	<0.5	48	190	<5	79	0.420
Feb-99	<0.5	1.2	0.7	26	<1	<0.5	<0.5	14	61	<5	47**	0.180
MW-3												
Jul-86	<5	NA	NA	NA	NA	NA	ND	<5	<5	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nov-86	6	NA	NA	NA	NA	NA	ND	100	4	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-88	2	NA	NA	NA	NA	NA	ND	6.2	2.6	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	NA	ND	ND	ND	NA	NA	NA
Jun-89	1	NA	NA	ND	NA	NA	ND	6	2	NA	NA	NA
Jan-90	ND	NA	NA	ND	NA	NA	ND	ND	2	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	<1	ND	<1	<1	NA	NA	NA
Aug-94	<1	<1	<1	<1	<1	<1	ND	<1	<1	1.4	14.3	<0.01
Mar-95	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	23.9	<0.01
Aug-95	<1	<1	<1	1.4	<1	<1	ND	<1	<1	<5	<10	<0.1
Feb-96	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.2
Aug-96	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Aug-97	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Feb-98	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Aug-98	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<1	3.52	<0.05
Feb-99	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.05
MW-4												
Jul-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Mar-87	0.5	NA	NA	NA	NA	NA	ND	1.6	1	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-88	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Jan-89	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Jun-89	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Jan-90	ND	NA	NA	ND	NA	NA	ND	1.9	ND	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	<1	ND	<1	<1	NA	NA	NA
Aug-94	<1	<1	<1	<1	<1	<1	ND	<1	<1	<1	6.4	<0.01
Mar-95	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	2.67
Aug-95	<1	<1	<1	1.1	<1	<1	ND	<1	<1	<5	<10	<0.1

TABLE 1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	200	32	5	6	0.5	100¹	NE	5	5	10	50	0.2²
Feb-96	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.2
Aug-96	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	<1	ND	<1	<1	<5	<10	<0.01
Aug-97	<1	<1	<1	<1	<1	<1	ND	1.2	<1	<5	<10	<0.01
Feb-98	<1	<1	<1	<1	<1	<1	ND	1.33	<1	<5	<10	<0.01
Aug-98	<0.5	<0.5	<0.5	<0.5	<1	<0.5	1.8	<0.5	<0.5	<1	5.89	<0.05
Feb-99	<0.5	<0.5	<0.5	<0.5	<1	<0.5	1.8	0.6	<0.5	<5	38	<0.05
MW-7												
Jul-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Mar-87	48	NA	NA	NA	NA	NA	ND	81	456	NA	NA	NA
Sep-87	56	NA	NA	NA	NA	NA	ND	93	200	NA	NA	NA
Feb-88	8.2	NA	NA	NA	NA	NA	ND	74	152	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	NA	ND	150	200	NA	NA	NA
Jun-89	50	NA	NA	42	NA	NA	ND	60	66	NA	NA	NA
Jan-90	1.6	NA	NA	440	NA	NA	ND	160	400	NA	NA	NA
Jun-94	<1	2.8	<1	40	<1	1.8	ND	42	280	NA	NA	NA
Aug-94	<1	17	6.2	140	1.7	2.4	ND	60	310	1.3	115	0.76
Mar-95	<1	4.5	<1	66	<1	<1	ND	28	145	<5	49.6	0.14
Aug-95	<1	<1	<1	43	<1	<1	ND	1.9	130	<5	26.5	0.025
Feb-96	<1	<1	<1	36	<1	<1	ND	18	120	<5	36.3	0.37
Aug-96	<1	4.5	1.3	46	<1	<1	ND	20	87	<5	38.2	0.30
Feb-97	<1	3.6	<1	41	<1	<1	ND	31	170	<5	35	0.126
Feb-97 Dup	<1	4.1	1.1	47	<1	<1	ND	35	180	NA	NA	NA
Aug-97	<1	<1	<1	43	<1	<1	ND	18	105	<5	17.4	<0.01
Aug-97 Dup	<5	<5	<5	45	<5	<5	ND	18	150	NA	NA	NA
Feb-98	<1	5.89	2.54	172	1.02	1.24	ND	57.3	222	<5	19.6	0.353
Aug-98	<0.5	<0.5	0.8	53	<1	<0.5	ND	16	170	<1	31.2	<0.05
Aug-98 Dup	<0.5	<0.5	0.7	60	<1	<0.5	<0.5	18	180	NA	NA	NA
Feb-99	<0.5	1.1	0.6	24	<1	<0.5	<0.5	9	82	<5	46	<0.05
MW-8												
Jul-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Mar-87	32	NA	NA	NA	NA	NA	ND	110	180	NA	NA	NA
Sep-87	3	NA	NA	NA	NA	NA	ND	27	47	NA	NA	NA
Feb-88	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	NA	ND	80	90	NA	NA	NA

TABLE 1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	200	32	5	6	0.5	100¹	NE	5	5	10	50	0.2²
Jun-89	30	NA	NA	180	NA	NA	ND	320	400	NA	NA	NA
Jan-90	ND	NA	NA	100	NA	NA	ND	56	160	NA	NA	NA
Jun-94	<1	<1	<1	16	<1	<1	ND	6.8	34	NA	NA	NA
Aug-94	<1	<1	9.4	<1	<1	<1	ND	5.5	22	4.8	135	<0.01
Mar-95	<1	<1	<1	11.7	<1	<1	ND	3.3	18.8	<5	20.4	<0.01
Aug-95	<1	<1	<1	7.9	<1	<1	ND	<1	19	<5	14.4	<0.1
Feb-96	<1	<1	<1	17	<1	<1	ND	11	35	<5	20.5	<0.2
Aug-96	<1	<1	1.6	16	<1	<1	ND	11	39	<5	<10	<0.01
Feb-97	<1	<1	<1	8.3	<1	<1	ND	12	33	<5	<10	<0.01
Aug-97	<1	<1	1.4	14	<1	<1	ND	12	32	<5	<10	<0.01
Feb-98	<1	<1	2.26	31.1	<1	<1	ND	23	52	<5	<10	<0.01
Aug-98	<0.5	<0.5	<0.5	2.6	<1	<0.5	<0.5	2.3	8.5	4.21	5.22	<0.05
Feb-99	<0.5	<0.5	0.6	6.2	<1	<0.5	0.6	4.7	15	<5	5	<0.05
MW-11												
Jul-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Nov-86	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Mar-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Sep-87	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
Feb-88	ND	NA	NA	NA	NA	NA	ND	ND	26	NA	NA	NA
Jan-89	ND	NA	NA	NA	NA	NA	ND	200	20	NA	NA	NA
Jun-89	ND	NA	NA	50	NA	NA	ND	10	270	NA	NA	NA
Jan-90	ND	NA	NA	231	NA	NA	ND	5.5	50	NA	NA	NA
Jun-94	<1	<1	<1	<1	<1	1.8	ND	7	86	NA	NA	NA
Aug-94	<1	<1	16	<1	<1	<1	ND	4.7	49	<1	13	<0.01
Mar-95	<1	<1	<1	20.3	<1	<1	ND	4.1	59.6	<5	13.1	<0.01
Aug-95	<1	<1	<1	12	<1	<1	ND	<1	43	<5	13.3	<0.01
Feb-96	<1	<1	<1	12	<1	<1	ND	3.8	40	<5	<10	<0.2
Aug-96	<1	<1	<1	12	<1	<1	ND	4.8	45	<5	<10	<0.01
Feb-97	<1	<1	<1	<1	<1	<1	ND	4.7	47	<5	<10	<0.01
Aug-97	<1	<1	<1	9.3	<1	<1	ND	4.3	30	<5	<10	<0.01
Feb-98	<1	<1	<1	23.6	<1	<1	ND	10.6	63.1	<5	<10	<0.01
Feb-98 Dup	<1	<1	<1	21.2	<1	<1	ND	10	59.4	NA	NA	NA
Aug-98	<0.5	<0.5	<0.5	9.1	<1	<0.5	1.4	2.7	37	<1	4.15	<0.05
Feb-99	<0.5	<0.5	<0.5	8.3	<1	<0.5	<0.5	3	38	<5	<5	<0.05
MW-12												
Aug-95	<1	<1	6.7	250	7	4.1	ND	13	540	<5	25.6	0.502
Feb-96	<5	<5	<5	230	<5	<5	ND	60	380	<5	37.5	0.38
Feb-96 Dup	<5	<5	<5	210	<5	<5	ND	57	360	NA	N.A	NA
Aug-96	<1	9.2	5.2	210	4.5	2.9	ND	65	330	<5	30.4	0.37

TABLE 1

HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	1,1,1-TCA (µg/l)	1,1,2-TCA (µg/l)	1,1-DCA (µg/l)	1,1-DCE (µg/l)	1,2-DCA (µg/l)	CFM (µg/l)	DFM (µg/l)	PCE (µg/l)	TCE (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Cyanide (mg/l)
Drinking Water Standard	200	32	5	6	0.5	100¹	NE	5	5	10	50	0.2²
Feb-97	<1	2.4	1.2	66	1.1	1.1	ND	39	220	<5	25.7	0.051
Aug-97	<5	<5	<5	120	<5	<5	ND	60	270	<5	32.9	0.11
Feb-98	<1	8.91	4.97	227	5.04	3.4	ND	60.7	489	<5	59.2	0.111
Aug-98	<0.5	2.4	1.5	110	1.8	0.6	<0.5	21	190	<1	30.7	0.16
Feb-99	<0.5	6.4	3.9	300	2.7	2.2	<0.5	47	520	<5	23**	0.19
Feb-99 Dup	<0.5	6.8	3.6	260	2.8	2.1	<0.5	48	460	<5	NA	0.07

Drinking water standards are Maximum Contaminant Levels as established by the California Department of Health Services.

¹ - Drinking water standard is for total trihalomethanes.

² - Drinking water standard is the Maximum Contaminant Level as established by the U.S. Environmental Protection Agency.

NA - Not Analyzed

ND - Not Detected

NE - Not Established

< - Not detected at the detection limit shown.

* - Well sampled on September 29, 1998, as well required repair before sampling could occur.

** - Well resampled for dissolved chromium on May 7, 1999.

1,1,1-TCA - 1,1,1-Trichloroethane

1,1,2-TCA - 1,1,2-Trichloroethane

1,1-DCA - 1,1-Dichloroethane

1,1-DCE - 1,1-Dichloroethene

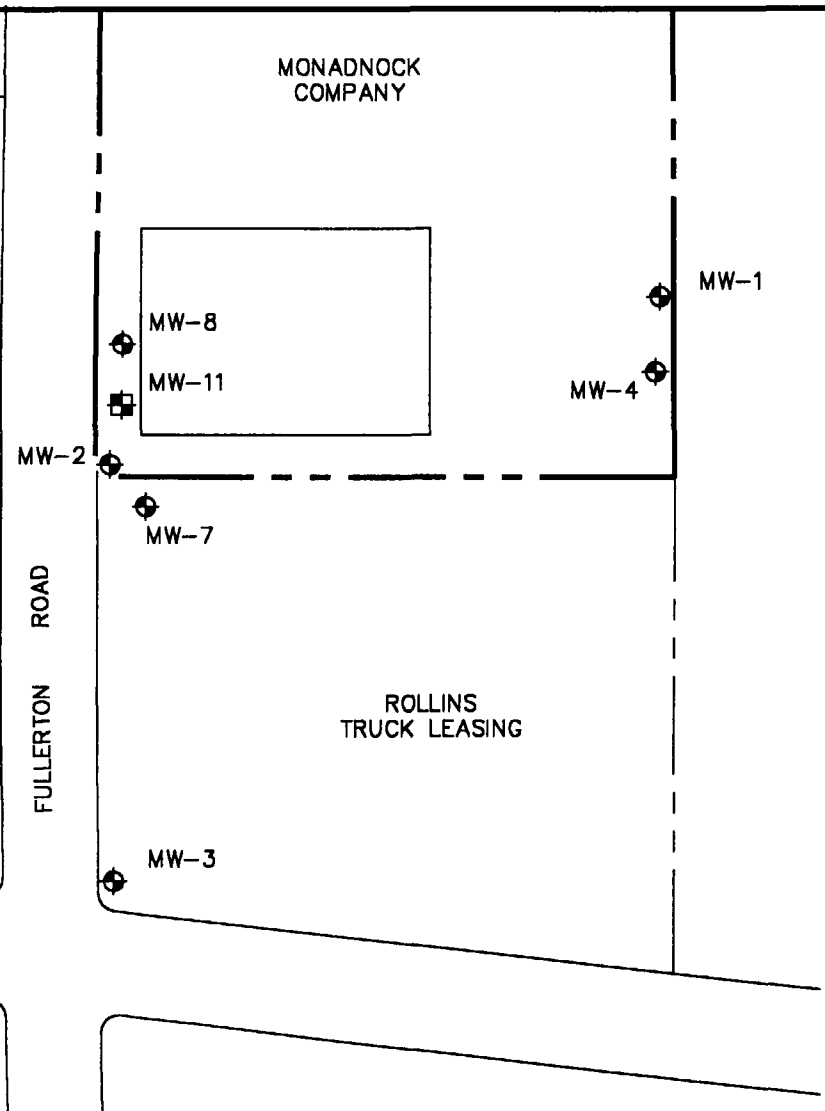
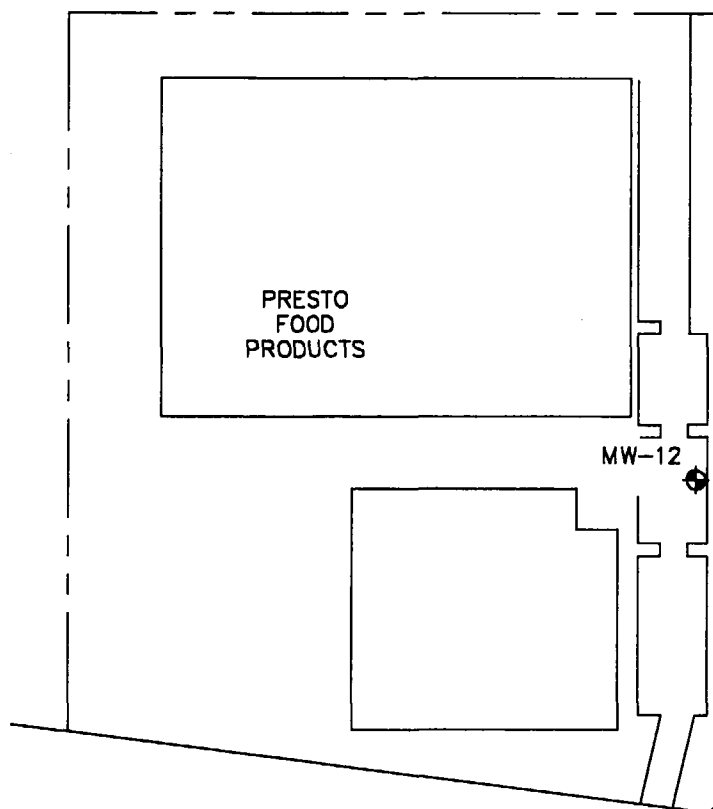
1,2-DCA - 1,2-Dichloroethane

CFM - Chloroform

DFM - Dichlorodifluoromethane

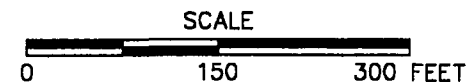
PCE - Tetrachloroethene

TCE - Trichloroethene



LEGEND:

- MW-2 INDICATES APPROXIMATE LOCATION OF SHALLOW MONITORING WELL
- MW-11 INDICATES APPROXIMATE LOCATION OF DEEPER MONITORING WELL
- INDICATES APPROXIMATE MONADNOCK COMPANY SITE BOUNDARY



410-2372.DWG



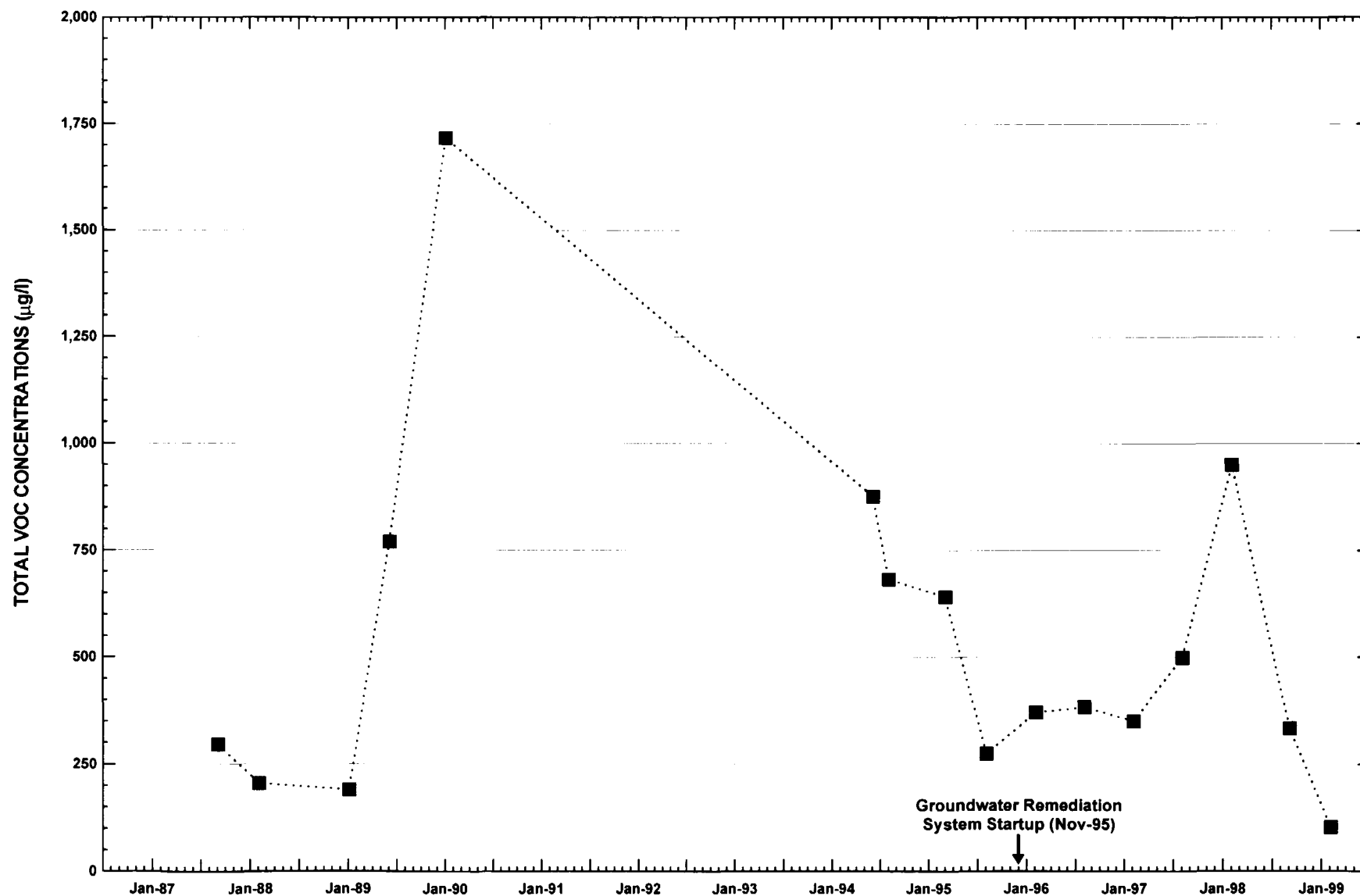
TRW INC.
1900 Richmond Road
Cleveland, Ohio 44124

DESIGNED	LAN
DRAWN	TEB/RR
REVIEWED	LAN
CHECKED	MT
SCALE	1"=150 FEET
DATE	7/28/99

THE MONADNOCK COMPANY

MONADNOCK WELL LOCATION MAP

REVISION	
PROJECT	MON.08.98.008
FIGURE	1



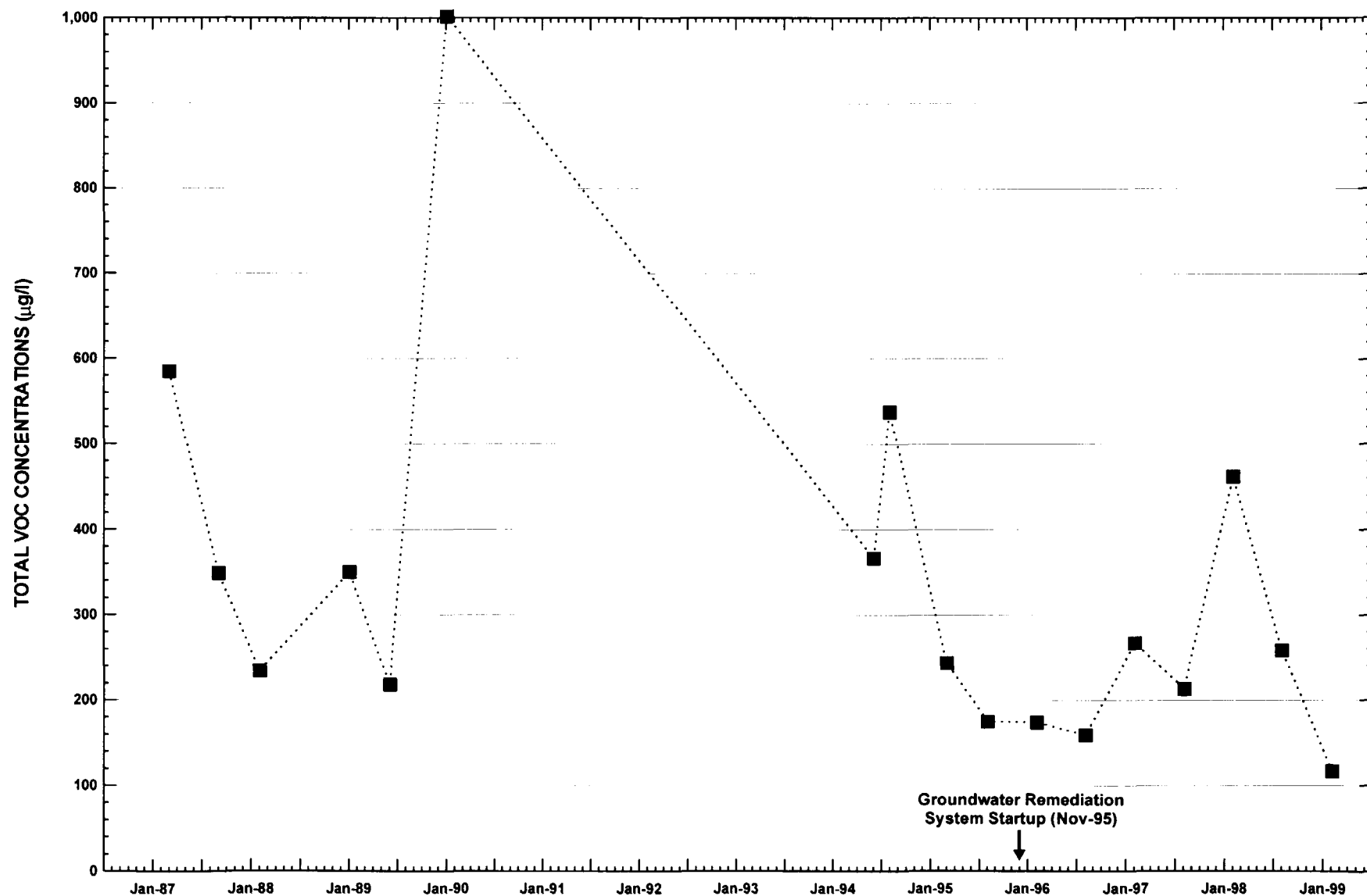
ORION ENVIRONMENTAL INC.

PROJECT NO. 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO. MONHD02.GRF	CHECKED BY JPG		

TRW - MONADNOCK

**TOTAL VOC CONCENTRATIONS
VERSUS TIME FOR WELL MW-2**

Figure 2



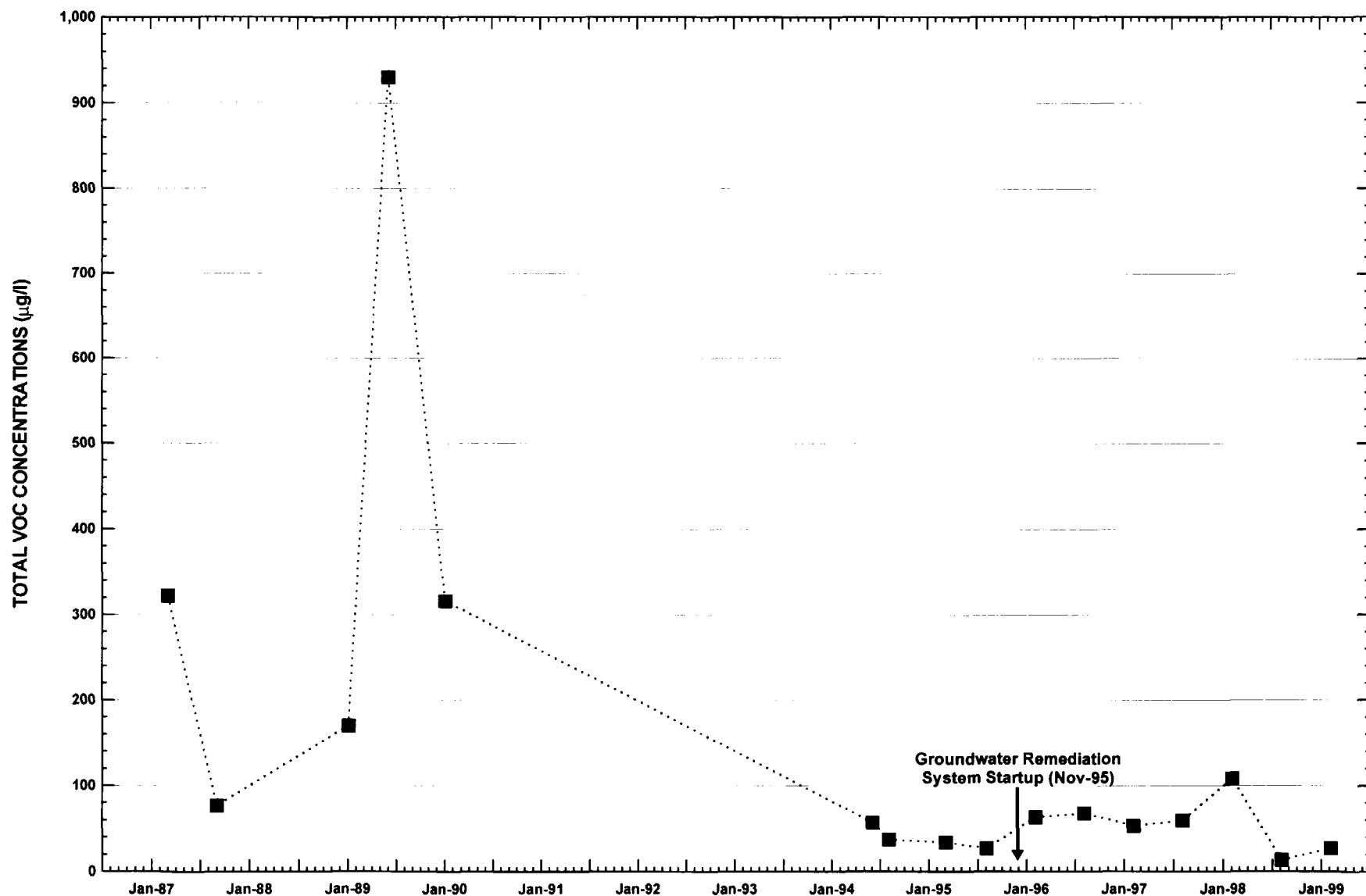
ORION ENVIRONMENTAL INC.

PROJECT NO. 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO. MONHD07.GRF		CHECKED BY JPG	

TRW - MONADNOCK

**TOTAL VOC CONCENTRATIONS
VERSUS TIME FOR WELL MW-7**

Figure 3



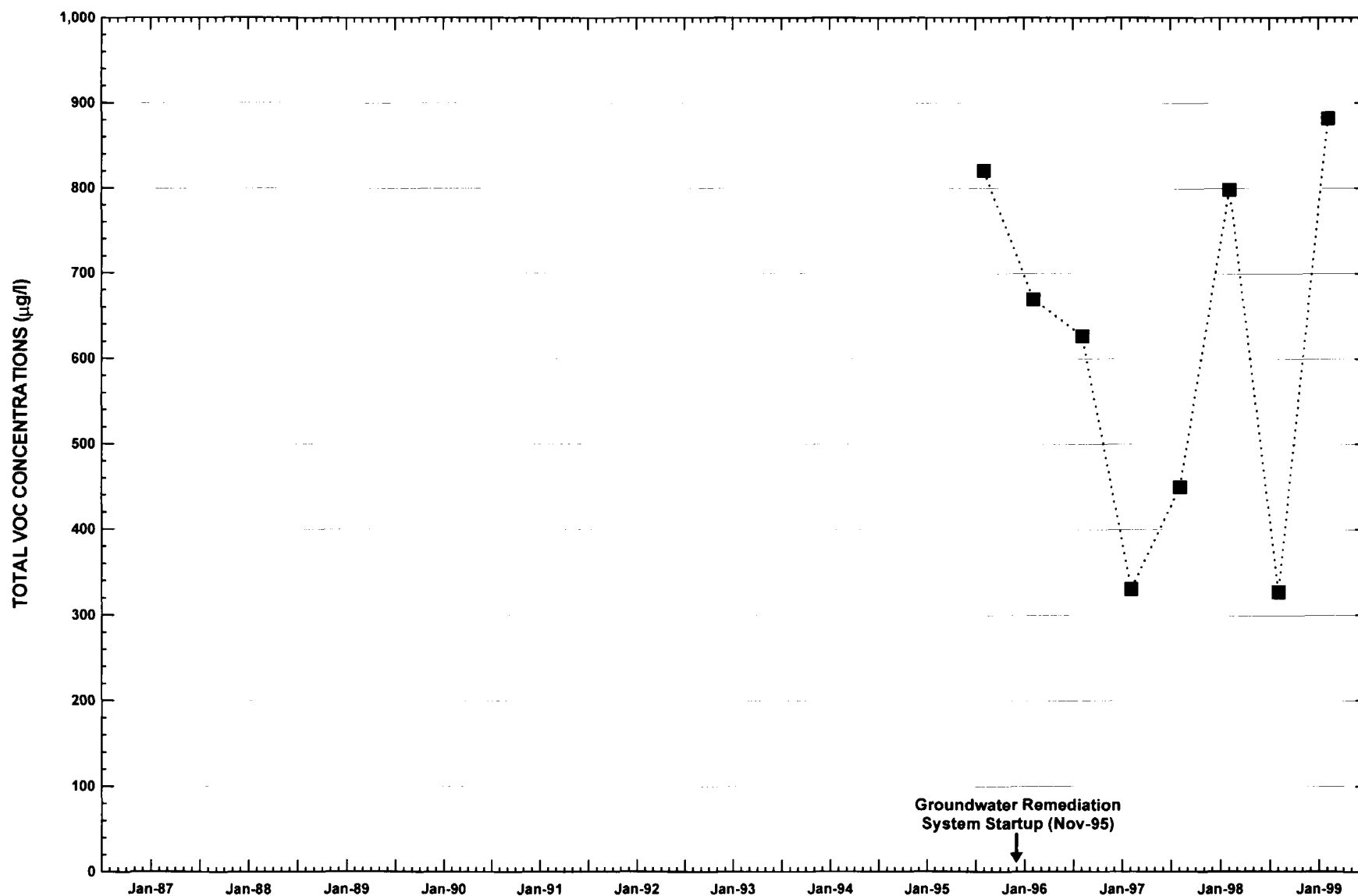
ORION ENVIRONMENTAL INC.

PROJECT NO. 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO. MONHD08.GRF	CHECKED BY JPG		

TRW - MONADNOCK

TOTAL VOC CONCENTRATIONS
VERSUS TIME FOR WELL MW-8

Figure 4



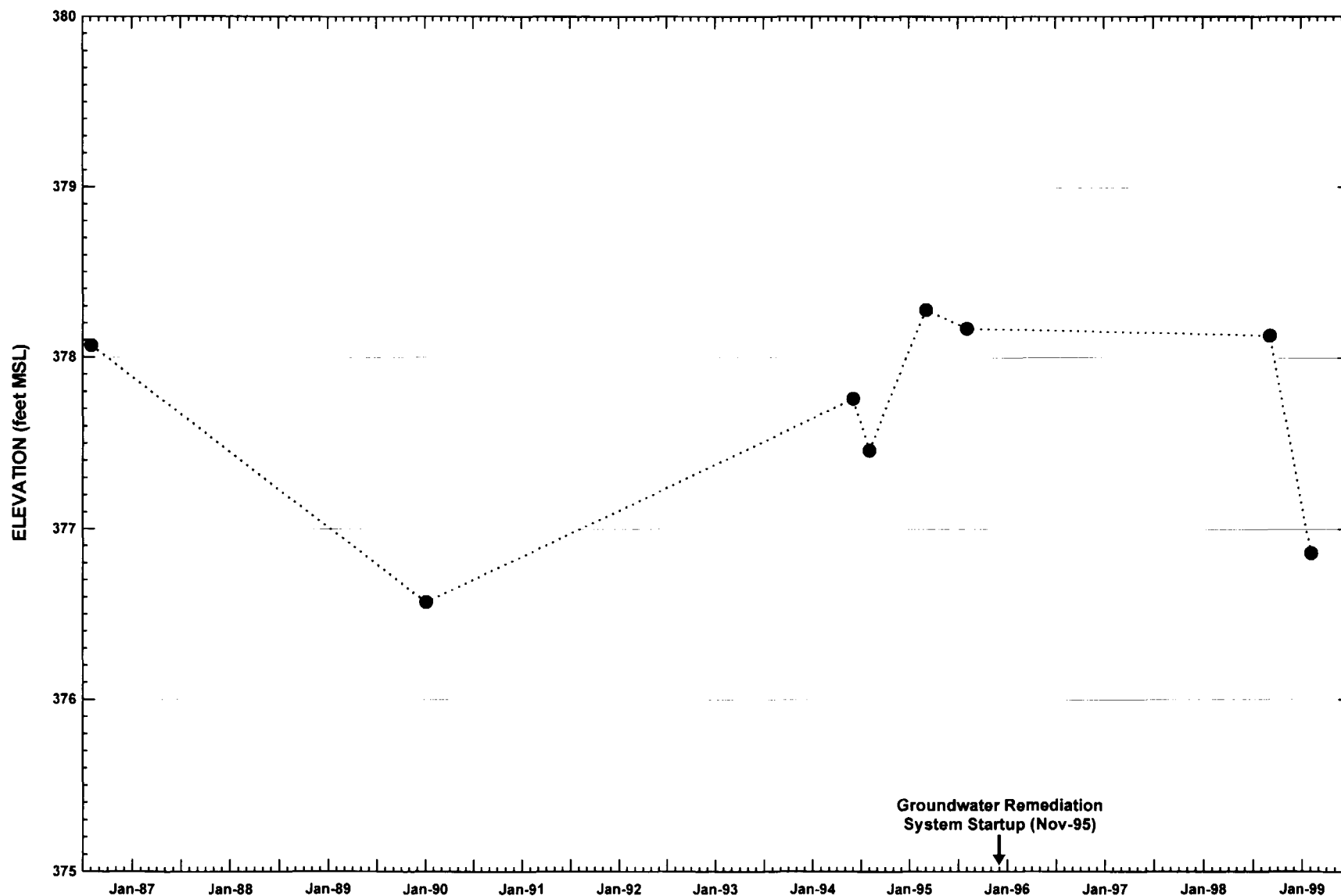
ORION ENVIRONMENTAL INC.

PROJECT NO	DATE	DRAWN BY	DESIGNED BY
02MON	JULY 1999	DN/LN	DN
FILE NO	CHECKED BY		
MONHD12.GRF	JPG		

TRW - MONADNOCK

TOTAL VOC CONCENTRATIONS
VERSUS TIME FOR WELL MW-12

Figure 5



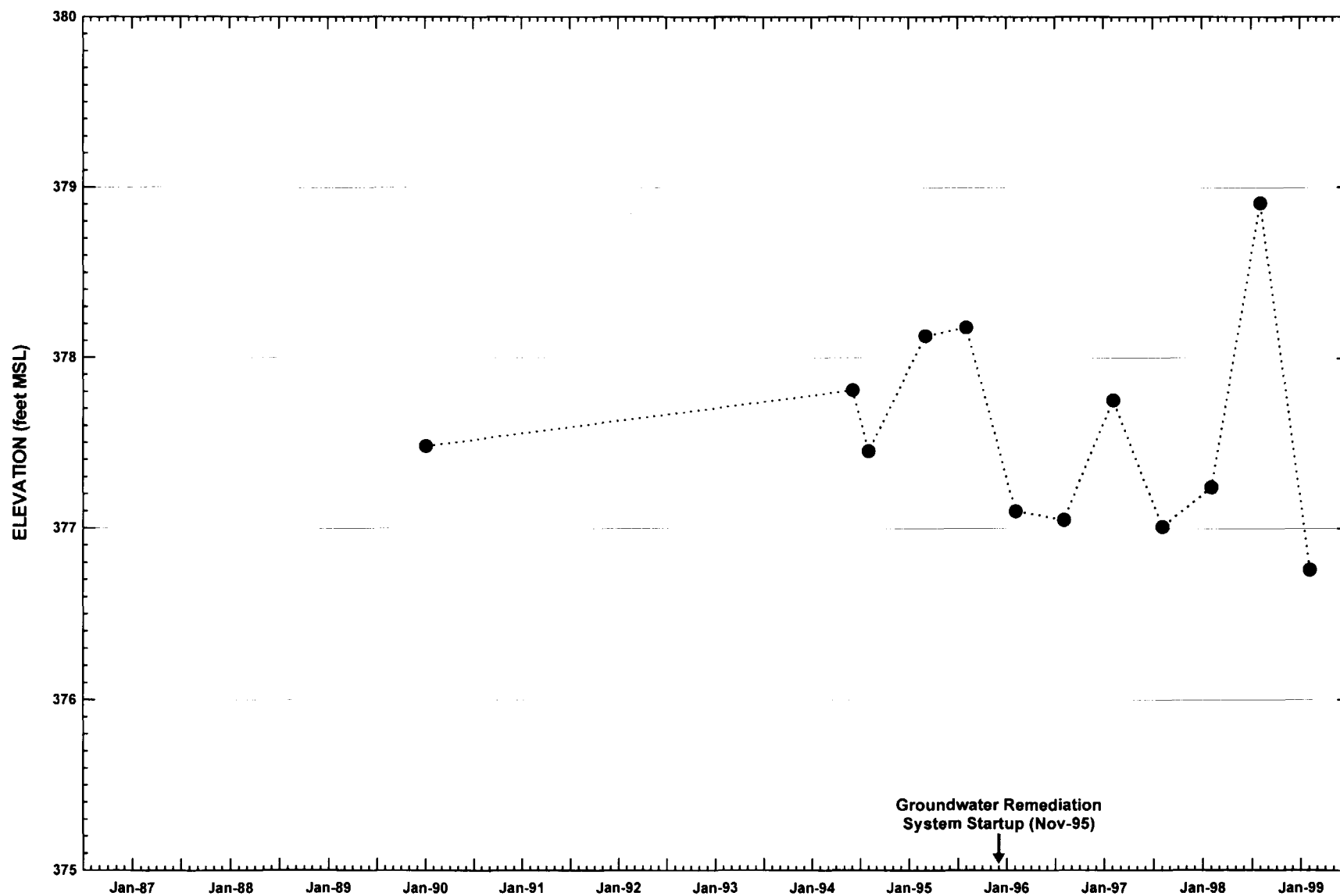
ORION ENVIRONMENTAL INC.

TRW - MONADNOCK

GROUNDWATER ELEVATIONS
VERSUS TIME FOR WELL MW-2

Figure 6

PROJECT NO. 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO MONGW02.GRF	CHECKED BY JPG		



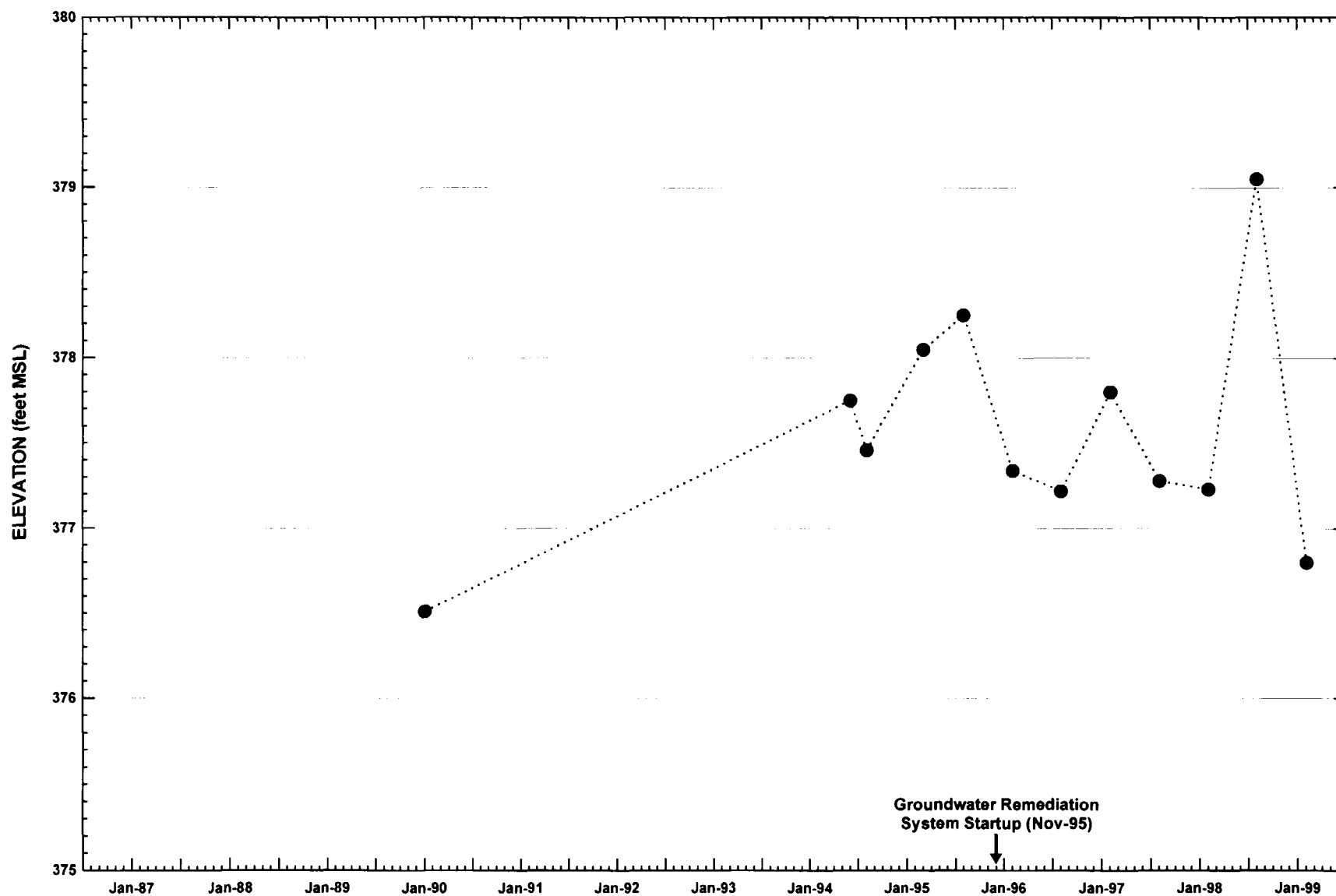
ORION ENVIRONMENTAL INC.

TRW - MONADNOCK

GROUNDWATER ELEVATIONS
VERSUS TIME FOR WELL MW-7

Figure 7

PROJECT NO 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO MONGW07.GRF	CHECKED BY JPG		



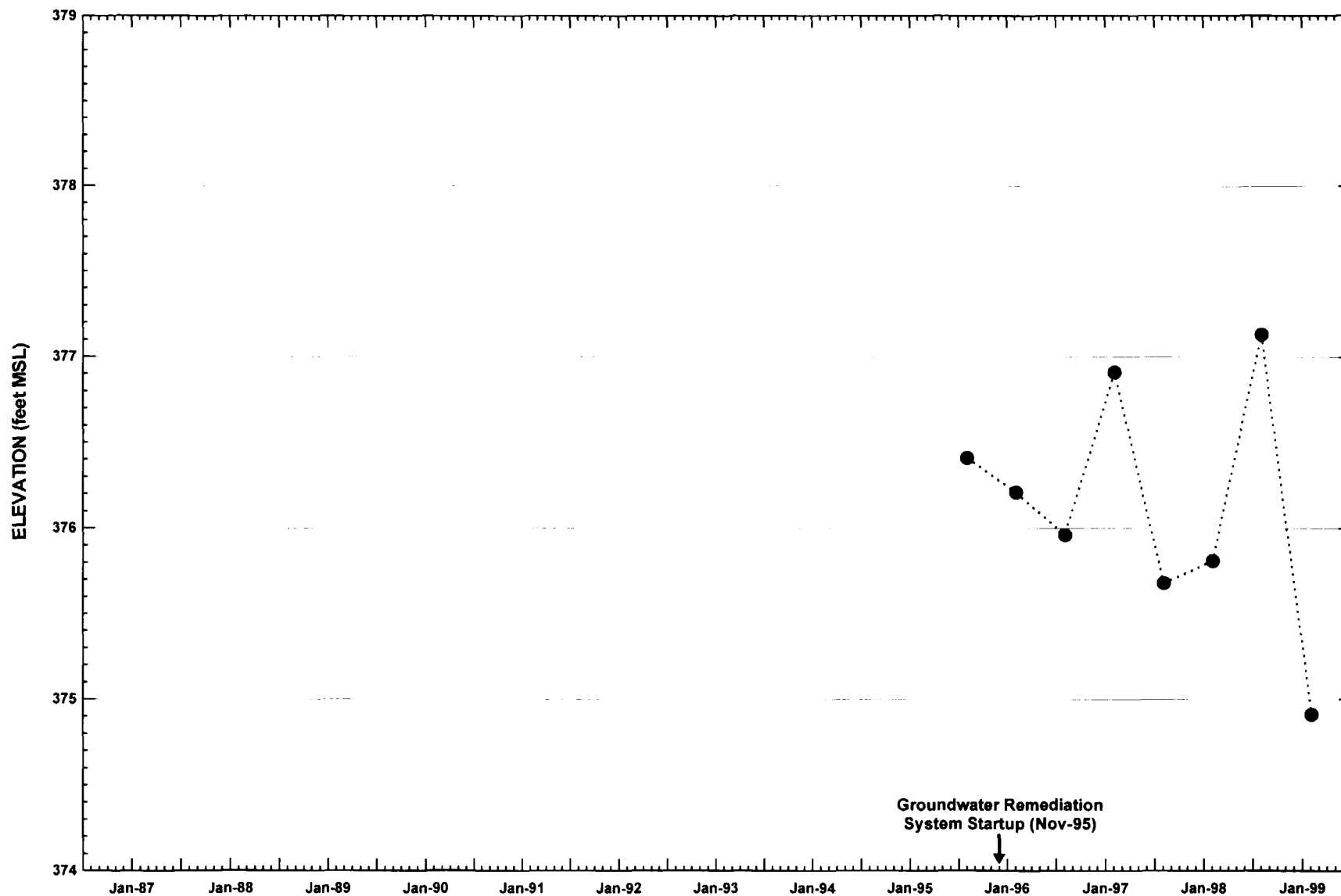
ORION ENVIRONMENTAL INC.

TRW - MONADNOCK

GROUNDWATER ELEVATIONS
VERSUS TIME FOR WELL MW-8

Figure 8

PROJECT NO 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO MONGW08.GRF	CHECKED BY JPG		



ORION ENVIRONMENTAL INC.

TRW - MONADNOCK

**GROUNDWATER ELEVATIONS
VERSUS TIME FOR WELL MW-12**

Figure 9

PROJECT NO. 02MON	DATE JULY 1999	DRAWN BY DN/LN	DESIGNED BY DN
FILE NO MONGW12.GRF	CHECKED BY JPG		